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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/596,137

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Jun Tanida

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EXAMINER

PATEL, NIRAV G

ART UNIT

PAPER NUMBER

4182

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/596,137	Applicant(s) TANIDA ET AL.	
	Examiner Nirav G. Patel	Art Unit 4182	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/8/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

It would be of great assistance to the Office if all incoming papers pertaining to a filed application carried the following items:

1. Application number (checked for accuracy, including series code and serial no.).
2. Group art unit number (copied from most recent Office communication).
3. Filing date.
4. Name of the examiner who prepared the most recent Office action.
5. Title of invention.
6. Confirmation number (See MPEP § 503).

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement filed September 8, 2006 complies with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609. It has been placed in the application file, and the information referred to therein has been considered as to the merits.

Specification

3. The abstract of the disclosure is objected to because it contains more than 150 words. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 through 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Tanida et al. ("Compact image capturing system based on compound imaging and digital reconstruction," "Tanida").

1) Regarding Claim 1, Tanida discloses an image configuring apparatus comprising an object image configuring means, which reads image data of a plurality of reduced object images from a reduced image recording means for recording image data of a plurality of reduced object images obtained by photographing an object as using a compound-eye camera that focuses a plurality of reduced object images on a photo detector through micro lens array having a plurality of micro lenses arrayed therein, and configures a single object image based on said image data and then outputs its image data (Page 34 Lines 1-2: A compact image capturing system called TOMBO is used which acquires a plurality of images through a micro lenses array, which then outputs a single image),

said object image configuring means comprising: a generating means of initial object image for generating an initial image data of a single object image based on an image data of a plurality of said reduced object images (Page 35 Lines 14-17: The

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photodetector array captures collective set of images. Using these images, original information of the image can be retrieved);

a reduced image estimating means for estimating an estimated image of each of said reduced object images from an image data of a provided single object image based on a geometric projection process (Page 38 Lines 5-6: A pixel rearrange method is used where pixels in the unit images are rearranged onto a virtual image plane, which is a parallel projection, a form of a geometric projection process. See Figure 7 for illustration.);

an object image updating means for updating an image data of said single object image provided in said reduced image estimating means by projecting a difference between said estimated image of each reduced object images and each of said reduced object images in an inverse process of said geometric projection process (Page 39 Lines 13-14: Linear interpolation between valid pixels (image data) is done to update the image data. Figure 9(c) shows the geometric process and 9(d) shows the updated image which uses interpolation (inverse of geometric process)) ; and

an iterative control means for firstly giving said initial image data to said reduced image estimating means as an initial value of an image data of said single object image, and then repetitively conducting a estimating processing of said reduced image estimating means as well as a updating processing of said object image updating means until said difference satisfying a predetermined condition, then outputting an image data of said single object image at the time of said difference satisfying said predetermined condition as a final image data of an object image (Page 39 Lines 17-18:

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an iterative algorithm is utilized which uses an evaluation function (predetermined condition) to update the image data of the single object image and produces (outputting) the image data of the single object image as final image data, as illustrated in Figure 10).

2) Regarding Claim 2, Tanida discloses in addition to the apparatus of claim 1, wherein said object image configuring means further comprises a shift amount calculating means for calculating a shift amount in regard to a gap of relative positions between said reduced object images through correlation calculation between said reduced object images by using an image data of a plurality of said reduced object images (Page 39 Lines 2-3: each unit image (reduced images) is correlated with a reference image to determine the lateral offset (shift amount)).

3) Regarding Claim 3, Tanida discloses in addition to the apparatus of claim 2, wherein said object image configuring means further comprises a projection process deriving means for obtaining a conversion equation indicating said geometric projection process employed in said reduced image estimating means based on said shift amount obtained in said shift amount calculating means (Page 39 Lines 4-6: $R(x, y)$ is a conversion equation, which is normalized correlation using $f(x, y)$ and $g(x, y)$ of the reference and unit images and the shift calculated of the shift amount calculating means).

4) Regarding Claim 4, Tanida discloses in addition to the apparatus of claim 2, wherein said generating means of initial object image in said object image configuring means generates an image data of a single object image by arranging a plurality of said

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reduced object images onto a same area based on said shift amount obtained in said shift amount calculating means, and then generates an initial image data of said single object image by interpolating blank pixels with respect to said image data (Page 39 Lines 9-10: The offset values (shift amount) of the unit images are calculated using the calculating means. These pixels are then mapped on the virtual image plane to generate image data of a single object image. Page 38 Lines 9-10: Interpolation is used to compensate information of the pixels which are not assigned the pixels of the unit images (blank pixels) generating an initial image data).

5) Regarding Claim 5, Tanida discloses an image configuring method for configuring a single object image based on an image data of a plurality of reduced object images obtained by photographing an object as using a compound-eye camera that focuses a plurality of reduced object images on a photo detector through micro lens array having a plurality of micro lenses arrayed therein (Page 34 Lines 4-5: A new algorithm for image reconstruction has been developed using a TOMBO system is used which generates a plurality of reduced object images on a microlens array (Figure 1)), comprising the steps of:

generating an initial image data of a single object image based on an image data of a plurality of said reduced object images (Page 35 Lines 14-17: The photodetector array captures collective set of images. Using these images, original information of the image can be retrieved);

estimating an estimated image of each of said reduced object images from an image data of a provided single object image based on a geometric projection process

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(Page 38 Lines 5-6: A pixel rearrange method is used where pixels in the unit images are rearranged onto a virtual image plane, which is a parallel projection, a form of a geometric projection process. See Figure 7 for illustration.);

updating an image data of said single object image provided in said reduced image estimating process by projecting a difference between estimated images of each of said reduced object images and each of said reduced object images in an inverse process of said geometric projection process (Page 39 Lines 13-14: Linear interpolation between valid pixels (image data) is done to update the image data. Figure 9(c) shows the geometric process and 9(d) shows the updated image which uses interpolation (inverse of geometric process));

providing said initial image data to said reduced image estimating process as an initial value of an image data of said single object image; repetitively conducting said reduced image estimating process as well as said object image updating process until said difference satisfying a predetermined condition; and outputting an image data of said single object image at the time of said difference satisfying said predetermined condition as a final image data of an object image (Page 39 Lines 17-18: an iterative algorithm is utilized which uses an evaluation function (predetermined condition) to update the image data of the single object image and produces (outputting) the image data of the single object image as final image data, as illustrated in Figure 10).

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nirav G. Patel whose telephone number is (571)270-5812. The examiner can normally be reached on Monday - Friday 8 am - 5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benny Tieu can be reached on 571-272-7490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nirav G. Patel/
Examiner, Art Unit 4182

/Benny Q Tieu/
Supervisory Patent Examiner, Art Unit 4182